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ABSTRACT:

PROBLEM TO BE SOLVED: To provide a camera constituted so that the deterioration in the operability of a zooming ring and a focusing ring is prevented and also the miniaturization can be attained.

SOLUTION: The camera is provided with the zooming ring 8 for manual-zooming, the focusing ring 9 for manual-focusing, an actuator 20 for automatic-focusing and a switching means 22 for switching the manual focusing and the automatic focusing. The zooming ring 8 and the focusing ring 9 are

continuously arranged in the axial direction so that the zooming operation can be performed by grasping the zooming ring 8 and the focusing ring 9 at automatic focusing.

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Notes:

1. Untranslatable words are replaced with asterisks (*).
2. Texts in the figures are not translated and shown as it is.

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FULL CONTENTS

[Claim(s)]

[Claim 1]A camera which is provided with the following and characterized by having continued in the direction of an axis and having arranged said zoom operation ring and said focal operation ring.

A zoom operation ring which performs zoom operation with manual operation.

A focal operation ring which performs focal operation with manual operation.

[Claim 2]It is a camera to a description in Claim 1 carrying out outer fitting of said focal operation ring to said a part of zoom operation ring.

[Claim 3]The camera comprising according to claim 1 or 2:

An actuator which performs focal operation automatically.

Connecting mechanism which connects said zoom operation ring and said focal operation ring when carrying out focal operation automatically.

[Claim 4]The camera according to claim 3, wherein it has a switching means which changes manual operation of focal operation, and automation and said switching means and said connecting mechanism comprise the same member.

[Claim 5]The camera according to any one of claims 1 to 4 establishing a fixing means which fixes said zoom operation ring when carrying out focal operation manually.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the camera which can perform focal operation and zoom operation with manual operation.

[0002]

[Description of the Prior Art]With the camera which has the conventional zoom function, from the body part, the camera cone which carried out the interior of the lens group projects, and is provided in many cases. In that case, the focal operation ring for performing focal operation with the zoom operation ring for performing zoom operation may be provided in a camera cone.

[0003] It is common that a focal operation ring is provided with a zoom operation ring in the zoom interchangeable lens for single-lens reflex cameras. In these camera cones, zoom and a focus were chosen only at the feel of the hand in many cases at the time of operation, and in order to prevent an operation mistake, each operation ring is detached and arranged in the direction of an axis on a camera cone.

[0004] The camera which can perform focal operation automatically by an actuator is also known. By changing focal operation automatically, an actuator is driven and focus operation to a photographic subject is performed automatically. At this time, the focal operation ring is usually locked so that lens movement cannot be carried out with manual operation.

[0005]

[Problem to be solved by the invention] However, the demand to the miniaturization of a camera is becoming strong in recent years, and the miniaturization of the radial direction of a camera cone and the direction of an axis is called for. If the direction of an axis of a camera cone is miniaturized, it will become difficult to secure widely the width and the interval of a zoom operation ring or a focal operation ring. Good operativity is not acquired, if especially the diameter of a lens is made small and width of a zoom operation ring or a focal operation ring will not be made larger than usual. For this reason, when the camera cone was miniaturized, there was a problem on which the operativity of a zoom operation ring and a focal operation ring gets worse. Thereby, with the small camera of the lens integral type, also when neither a zoom operation ring nor a focal operation ring was carried, it was.

[0006] An object of this invention is to provide the camera which can attain a miniaturization while preventing aggravation of the operativity of a zoom operation ring and a focal operation ring.

[0007]

[Means for solving problem] To achieve the above objects, this invention is provided with the zoom operation ring which performs zoom operation with manual operation, and the focal operation ring which performs focal operation with manual operation, and is characterized by having continued in the direction of an axis and having arranged said zoom operation ring and said focal operation ring.

[0008] According to this composition, a lens moves by rotation of a focal operation ring, focal operation is performed manually, a lens moves by rotation of a zoom operation ring, and zoom operation is performed. Zoom operation and focal operation are performed by grasping the zoom operation ring and the focal operation ring which are arranged continuously, and rotating.

[0009] This invention is characterized by carrying out outer fitting of said focal operation ring to said a part of zoom operation ring in the camera of the above-mentioned composition.

[0010] This invention is characterized by establishing the actuator which performs focal operation automatically, and the connecting mechanism which connects said zoom operation ring and said focal operation ring when carrying out focal operation automatically in the camera of each above-mentioned composition. According to this composition, a zoom operation ring and a focal operation ring are connected by connecting mechanism during automation of focal operation, and zoom operation will be performed if it is made to rotate simultaneously.

[0011] In the camera of the above-mentioned composition, this invention is provided with the switching means which changes the manual operation of focal operation, and automation, and is characterized by said switching means and said connecting mechanism comprising the same member. According to this composition, a zoom operation ring and a focal operation ring can rotate independently at the time of the

manual operation of focal operation, and if focal operation is changed to automation by a switching means, a zoom operation ring and a focal operation ring will be connected.

[0012]In the camera of each above-mentioned composition, when this invention carries out focal operation manually, it is characterized by establishing the fixing means which fixes said zoom operation ring. According to this composition, a zoom operation ring is fixed during the manual operation of focal operation, and a focal operation ring can be rotated independently.

[0013]

[Mode for carrying out the invention]The embodiment of this invention is described with reference to Drawings below. Drawing 1 is an outline perspective view showing the camera of a 1st embodiment. The camera cone 7 which has a lens group protrudes on the front of the body part 2 in which the camera 1 carried out the interior of the film or image sensor (all are un-illustrating) with which a photographic subject image is formed.

[0014]The release button 6 is formed in the upper surface of the end of the body part 2, and exposure operation is performed by the bottom of ** of the release button 6. A user looks into in the upper part of the body part 2, and a photographic subject's composition is provided in the ***** finder window 3. The AF module 5 which is provided with a light-emitting part and a light sensing portion, and detects distance with a photographic subject with a triangulation method, and the flash 4 which ejects the illumination light at the time of photography are formed in the front of the body part 2. The method of AF is not restricted to this. When an image sensor is a digital camera by which interior is carried out, it may be what is called a video AF method that used the picture information on an image sensor.

[0015]Drawing 2 is a sectional view showing the details of camera cone 7 portion. The going-straight pipe 17 of the byway is being fixed to the body part 2 by the same mind rather than the fixing cylinder 10 and the fixing cylinder 10. The penetration hole 10a prolonged in the direction of a circumference is formed in the fixing cylinder 10. The penetration hole 17a prolonged in the direction of an axis is formed in the going-straight pipe 17.

[0016]The cam ring 16 which can rotate is formed between the fixing cylinder 10 and the going-straight pipe 17. The pore 16a and the cam groove 16b are formed in the cam ring 16. Outer fitting of the zoom operation ring 8 is carried out to the external surface of the fixing cylinder 10. The crevice 8a was formed in some peripheral surfaces of the zoom operation ring 8, and the focal operation ring 9 has fitted into the crevice 8a. Thereby, the zoom operation ring 8 and the focal operation ring 9 continue in the direction of an axis, and are arranged, and both peripheral surface is allotted on the cylinder side same in abbreviation.

[0017]The guide pin 21 which penetrates the penetration hole 10a of the fixing cylinder 10 to the zoom operation ring 8, and fits into the pore 16a of the cam ring 16 is formed in one. Thereby, the zoom operation ring 8 and the cam ring 16 can rotate now to one.

[0018]In the camera cone 7, the lens group which comprises the forefront ball 11, the zoom lens 12, and the focal lens 13 sequentially from the front side is allotted. The forefront ball 11 is being fixed to the front side of the fixing cylinder 10. The zoom lens 12 is held at the zoom lens holding frame 14. The zoom lens holding frame 14 and the guide pin 15 formed in one penetrate the penetration hole 17a of the going-straight pipe 17, and is engaging with the cam groove 16b of the cam ring 16. Thereby, the position of the zoom lens 12 is held.

[0019]The focal lens 13 is held at the focal lens holding frame 18. A penetration hole (un-illustrating) is

provided in the end of the focal lens holding frame 18, and focal lens ***** 19 fixed to the body part 2 is inserted in this penetration hole. The motor shaft 20a of the focal motor 20 is screwed in the other end of the focal lens holding frame 18. If the focal motor 20 is driven, the focal lens holding frame 18 is guided at focal lens ***** 19, and it has come to be able to carry out going-straight movement of the focal lens 13.

[0020]In the body part 2, the amount primary detecting element 32 (refer to [drawing 3](#)) of focal operation ring rotations which comprises the photograph reflector etc. which detect the amount of rotations of the focal operation ring 9 is formed. The focal motor 20 is driven also with the output signal of the amount primary detecting element 32 of focal operation ring rotations while driving it with the output signal of the AF module 5 (refer to [drawing 1](#)). For this reason, the changeover switch 22 (refer to [drawing 3](#)) which changes the manual operation by rotation of the focal operation ring 9 and automation by the detection result of the AF module 5 is formed.

[0021][Drawing 3](#) is a block diagram showing the system of the camera 1. CPU34 which controls the drive of each part is provided in the body part 2. The changeover switch 22, the amount primary detecting element 32 of focal operation ring rotations, and the AF module 5 are connected to CPU34, and these output signals are inputted. The driver 35 which drives the focal motor 20 is connected to CPU34.

[0022]In CPU34, according to the change of the changeover switch 22, the drive quantity of the focal motor 20 according to the output signal of the amount primary detecting element 32 of focal operation ring rotations or the AF module 5 calculates, and drive quantity is sent to the driver 35. The driver 35 gives the driving current according to predetermined drive quantity to the focal motor 20, and the drive of the focal motor 20 based on the amount of rotations of the focal operation ring 9 or the detection result of the AF module 5 is performed.

[0023]In the camera 1 of the above-mentioned composition, when the changeover switch 22 is made into the manual-operation side, if the focal operation ring 9 is rotated, the focal motor 20 will drive according to the amount of rotations, and the focal lens 13 will be arranged in a desired position. Thereby, focal operation is performed manually.

[0024]If the zoom operation ring 8 is rotated, the cam ring 16 will rotate via the guide pin 21. As a result, the guide pin 15 and the cam groove 16b are engaged, the guide pin 15 is guided at the penetration hole 17a of the going-straight pipe 17, and the zoom lens 12 carries out going-straight movement. Thereby, zoom operation is performed.

[0025]When the changeover switch 22 is made into an automatic side, the focal motor 20 drives according to the output signal of the AF module 5, and the focal lens 13 is arranged in a desired position. Thereby, focal operation is performed automatically. Zoom operation is performed by rotation of the zoom operation ring 8 like the above.

[0026]At this time, even if it rotates the focal operation ring 9, it does not participate in movement of the focal lens 13. For this reason, with the zoom operation ring 8, the focal operation ring 9 can be grasped and zoom operation can be performed. Therefore, since a wide operation ring (the zoom operation ring 8 and the focal operation ring 9) can be grasped even if it miniaturizes the camera cone 7 in the direction of an axis, aggravation of the operativity at the time of zoom operation can be prevented. Since the width of the focal operation ring 9 is short when performing focal operation manually, operativity is bad, but since focal operation has many opportunities held automatically, it sets at the time of use of the usual camera, and there is no trouble in particular.

[0027]Next, drawing 4, drawing 5, and drawing 6 are the outline perspective views and the sectional views of a camera cone portion showing the camera of a 2nd embodiment. In these figures, the same numerals are given to the same portion as a 1st embodiment shown in above-mentioned drawing 1 - drawing 3. A different point from a 1st embodiment is a point which arranges the changeover switch 22 which changes the manual operation of focal operation, and automation to a part of zoom operation ring 8. Other portions are the same as that of a 1st embodiment.

[0028]The changeover switch 22 has abbreviated L character type section shape, and the slide movement of it has become possible forward and backward. The slot 9a in which the changeover switch 22 and engagement are possible is formed in a part of back end of the focal operation ring 9. And if the changeover switch 22 is arranged on the back end, it will be in the state in which focal operation is possible manually, and if it allots the front end, focal operation will be performed automatically.

[0029]Drawing 5 shows the state where the changeover switch 22 was arranged on the back end, and rotation of the focal operation ring 9 and the zoom operation ring 8 is attained independently. Drawing 6 shows the state where the changeover switch 22 was made to slide to the front. The changeover switch 22 engages with the slot 9a of the focal operation ring 9, and the focal operation ring 9 can rotate it now to the zoom operation ring 8 and one.

[0030]Therefore, the focal operation ring 9 can be independently rotated to the zoom operation ring 8 at the time of the focal operation by manual operation. The focal operation ring 9 and the zoom operation ring 8 can connect at the time of the focal operation depended automatically, and one can be made to rotate it.

Therefore, while being able to acquire the same effect as a 1st embodiment, the zoom operation ring 8 and the focal operation ring 9 can really be rotated easily, and operativity can be raised. The changeover switch 22 may be formed in other positions, and the focal operation ring 9 and the zoom operation ring 8 may be connected in the changeover switch 22 by the connecting member which comprises a separate member.

[0031]Next, drawing 7 is a sectional view showing a camera cone portion of a camera of a 3rd embodiment. The same numerals are given to the same portion as a 2nd embodiment shown in above-mentioned drawing 4 - drawing 6. A different point from a 2nd embodiment forms the changeover switch 22 in abbreviated T character type section shape, and the large friction material 23 (fixing means) of a coefficient of friction of rubber etc. is formed in the back end of the changeover switch 22. An energizing means (un-illustrating) which energizes the changeover switch 22 to the body part 2 side at the time of retreat of the changeover switch 22 is established. Other points are the same as that of a 2nd embodiment.

[0032]Drawing 7 shows the state where the changeover switch 22 was arranged on the back end, and rotation of the focal operation ring 9 is independently attained to the zoom operation ring 8. Drawing 8 shows the state where the changeover switch 22 was made to slide to the front. The changeover switch 22 engages with the slot 9a of the focal operation ring 9, and the focal operation ring 9 can rotate it to the zoom operation ring 8 and one.

[0033]According to this embodiment, the changeover switch 22 is pressed by the body part 2 by an energizing means at the time of the focal operation by manual operation. For this reason, the zoom operation ring 8 is fixed by the frictional force of the friction material 23 and the body part 2, and one rotation with the focal operation ring 9 and the zoom operation ring 8 can be prevented according to it. Therefore, while being able to acquire the same effect as a 2nd embodiment, the operativity of the focal operation by manual operation can be raised.

[0034]The changeover switch 22 may be formed in other positions, and the zoom operation ring 8 may be fixed in the changeover switch 22 by the friction material etc. which comprise a separate member. It may change to the friction material 23 and other fixing means may be established. For example, a wedge shaped part may be inserted in the slot which formed the wedge shaped part in the back end of the changeover switch 22, and was annularly formed in the body part 2, and the zoom operation ring 8 may be fixed.

[0035]Next, drawing 9 is an outline perspective view showing the camera of a 4th embodiment. The same numerals are given to the same portion as a 1st embodiment shown in above-mentioned drawing 1. A different point from a 1st embodiment is a point which adjoins in the direction of an axis and is installing the zoom operation ring 8 and the focal operation ring 9 side by side. Other portions are the same as that of a 1st embodiment.

[0036]Also in this embodiment, like a 1st embodiment, the focal operation ring 9 can be grasped and zoom operation can be performed with the zoom operation ring 8 at the time of the focal operation depended automatically. Therefore, even if it miniaturizes the camera cone 7 in the direction of an axis, aggravation of the operativity at the time of zoom operation can be prevented.

[0037]Like a 1st embodiment, outer fitting of the focal operation ring 9 may be carried out to the zoom operation ring 8, and the zoom operation ring 8 and the focal operation ring 9 may be installed side by side. The same changeover switch 22 as a 2nd and 3rd embodiment may be formed in this embodiment.

[0038]In the 1st - a 4th embodiment, as shown in drawing 10, the zoom motor 36 which drives the amount primary detecting element 33 of zoom operation ring rotations and the zoom lens 12 which detect the amount of rotations of the zoom operation ring 8 may be formed. That is, based on the output signal according to the amount of rotations of the zoom operation ring 8 detected by the amount primary detecting element 33 of zoom operation ring rotations, CPU34 drives the zoom motor 36 via the driver 35. Thereby, the zoom lens 12 moves and zoom operation is performed.

[0039]Even if it miniaturizes the camera cone 7 in the direction of an axis like the 1st - a 4th embodiment also in this composition, when performing focal operation automatically, aggravation of the operativity of the zoom operation by manual operation can be prevented. Since camera cone composition can be simplified, the further miniaturization is also attained.

[0040]In the case of the zoom interchangeable lens of a single-lens reflex camera as well as the camera of lens barrel one, the same effect can be acquired with the application of the 1st - the same camera cone as a 4th embodiment.

[0041]

[Effect of the Invention]Since according to this invention it continued in the direction of an axis and the zoom operation ring and the focal operation ring are arranged, at the time of the focal operation depended automatically, with a zoom operation ring, a focal operation ring can be grasped and zoom operation can be performed. Therefore, even if it is a case where a camera cone is miniaturized in the direction of an axis, aggravation of the operativity at the time of zoom operation can be prevented.

[0042]Since outer fitting of the focal operation ring is carried out to a part of zoom operation ring according to this invention, while continuing in the direction of an axis and being able to arrange a zoom operation ring and a focal operation ring easily, width of a zoom operation ring can be made large.

[0043]Since according to this invention the connecting mechanism which connects a zoom operation ring and a focal operation ring was established when carrying out focal operation automatically, a zoom operation

ring and a focal operation ring can really be rotated easily, and operativity can be raised.

[0044]Since the switching means and connecting mechanism which change the manual operation of focal operation and automation comprise the same member according to this invention, part mark are reducible, while performing connection to a focal operation ring and a zoom operation ring, and the change of focal operation by one operation and preventing an operation mistake.

[0045]Since according to this invention the fixing means which fixes a zoom operation ring was established when carrying out focal operation manually, the operativity at the time of the focal operation by manual operation can be raised.

[Brief Description of the Drawings]

[Drawing 1]They are ** and an outline perspective view showing the camera of a 1st embodiment of this invention.

[Drawing 2]It is a sectional view showing ** and the camera cone portion of the camera of a 1st embodiment of this invention.

[Drawing 3]They are ** and a block diagram showing the system structure of the camera of a 1st embodiment of this invention.

[Drawing 4]They are ** and an outline perspective view showing the camera of a 2nd embodiment of this invention.

[Drawing 5]It is a sectional view showing ** and the camera cone portion of the camera of a 2nd embodiment of this invention.

[Drawing 6]It is a sectional view showing ** and the camera cone portion of the camera of a 2nd embodiment of this invention.

[Drawing 7]It is a sectional view showing ** and the camera cone portion of the camera of a 3rd embodiment of this invention.

[Drawing 8]It is a sectional view showing ** and the camera cone portion of the camera of a 3rd embodiment of this invention.

[Drawing 9]They are ** and an outline perspective view showing the camera of a 4th embodiment of this invention.

[Drawing 10]They are ** and a block diagram showing the system structure of the camera of other embodiments of this invention.

[Explanations of letters or numerals]

1 Camera

2 Body part

3 Finder window

4 Flash

5 AF module

6 Release button

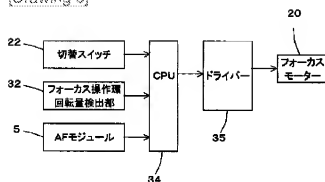
7 Camera cone

8 Zoom operation ring

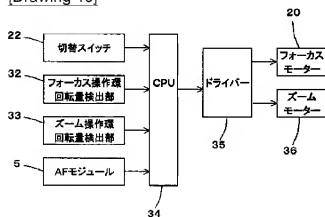
9 Focal operation ring

- 10 Fixing cylinder
- 11 Forefront ball
- 12 Zoom lens
- 13 Focal lens
- 15 and 21 Guide pin
- 16 Cam ring
- 17 Going-straight pipe
- 20 Focal motor
- 22 Changeover switch
- 23 Friction material

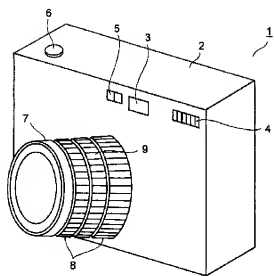
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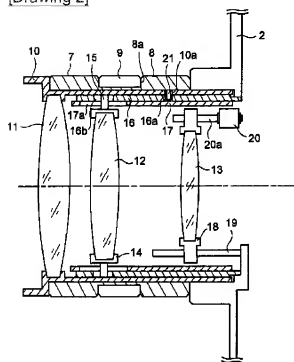
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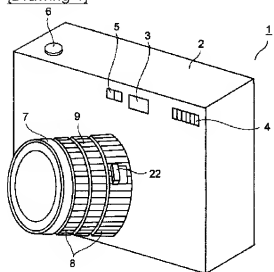
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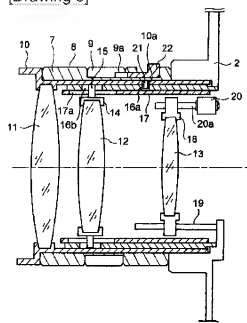
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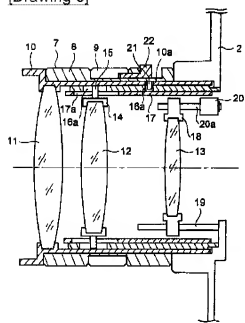
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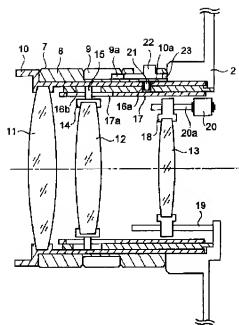
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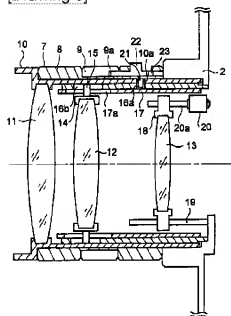
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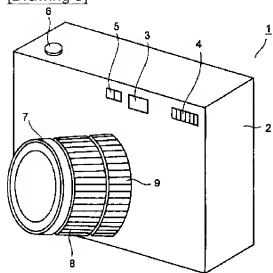
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]